THE CONTEMPORARY ARCHITECTURE DESING FOR THE HOUSING GREEN BUILDINGS AND IT'S ROLE IN SAVING ENERGY IN THE ARAB CITY

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ABSTRACT:

In the Arab cities the housing buildings is to be exposed to the sun-hot rays specially in the summer, which is effected on peoples indoors and outdoors. Therefore, many peoples used Air conditioning apparatus to have the cold air in their houses.

And now we in the age of the advanced technology in Architecture and construction, then its very important to realize the suitable Architecture design indoor for living areas by using the large several new and contemporary building materials. And treat the case of the hot climate with the importance of the environmental spaces outdoor the housing buildings, which aims to realize the comfort temperature and do reducing the consumptions of electricity in the air conditioning and the payments of money, and the important one is to save energy in the housing buildings and urban zones in the Arab cities.

At the end we exhibit the important results and recommendations.

INTRODUCTION:

The research study the problem now is in the high consumption in the electric energy in the buildings of the urban settlements, specially in housing buildings. That consumption became very high and very expensive over the possibilities of the families. Now many voices speaking about rationality in the consumption of the electric energy, which is considered very high in the urban cities specially in houses, then it is very necessary to trying to have solutions from rationality in the electric energy in housing, and to study the environmental effective elements on the inhabitants in the hot zones. The urban housing environment and it's components, the elements which help us to reduce the uses of electrical energy in houses. This study reflected positive national using for electricity in the housing buildings. In the other hand is to benefit from sun energy and wind energy in producing electricity for the urban uses.

FIRST TOPIC: THE TRADITIONAL AND HISTORICAL HOUSING ENVIRONMENT IN THE ARAB CITY:

The traditional and historical housing environmental zone in the Arab city is considered the nucleus and important zone in the modern city, which extended with big areas and that old zone is represented a smell zone from it (the contemporary Arab City)Fig(1)[1]

The important of the old environmental zone is due to some elements:

- The architecture and urban historical heritage and the destinguished style locally and nationality like palaces, housing, mosques and general buildings. Fig(2)[2]

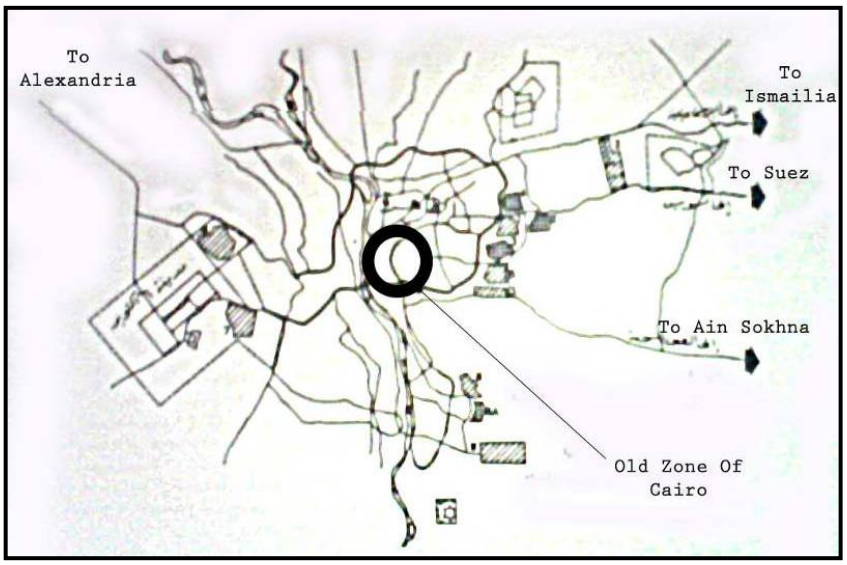


Figure 1. The Metropolis Cairo City and The Old Zone of Cairo[1]

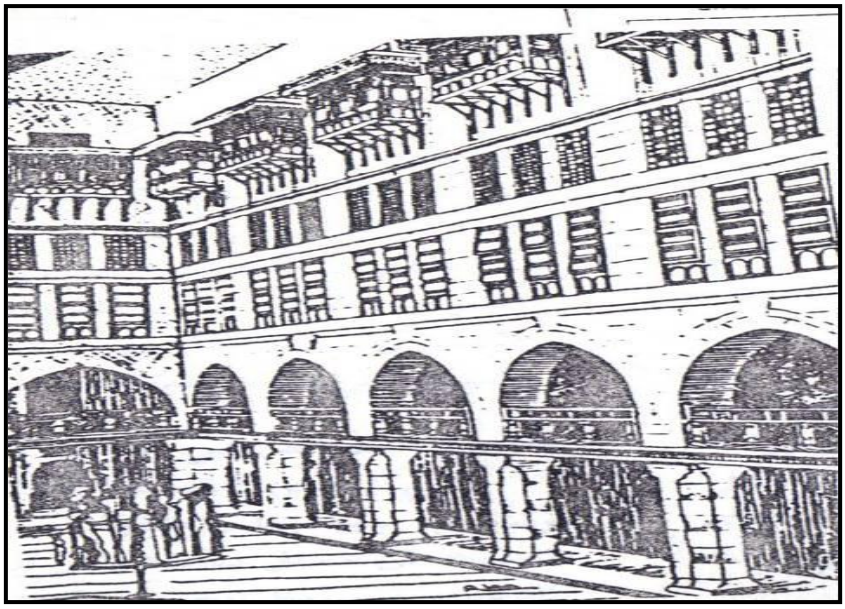


Figure 2. Algori Agency In The Old And Historical Zone Of Cairo

- The distinguished design for the buildings in the environmental and social directions, and the treatment of the case of hot climate. Fig(3)[8]
- The suitable enivronmental planning as the possibilities of the last ages with making contral of the hot climate.Fig(4)[2]

From the last figures we saw the adaptation with the case of hot climate and environmental in designing the housing and general buildings.Peoples used importnant and effectives elements for these purposes and these elements are:-

The interior green court: which destinguished with:

- Shadow realized for the court and the elements related to it and as the setting place (Takhtaboush).
- Specialty for inhabitants by making the above walls with enough height to realized it around the court. and there is an entrance for women speciality. Fig (3)

***WINDCATCHER:**

The architectural element used in many old arab cities, it aims to pass cold air to the house elements specially the living room, from the air (wind) above the last floor of the house and to pass it through some area of water to cold it and to pass to the different zones which has windows or opening in a high level of rooms to pass the hot air from it.

***THE ORICLS:**

It's important is resort to covering windows specially the outer in the aim to:

- Realizing the factor of speciallity of homes.
- Realizing shadows for protecting for the hot sun-rays in summer.

Realizing the destinguishing in the Islamic Architecture and it's style. Fig(3)[2]

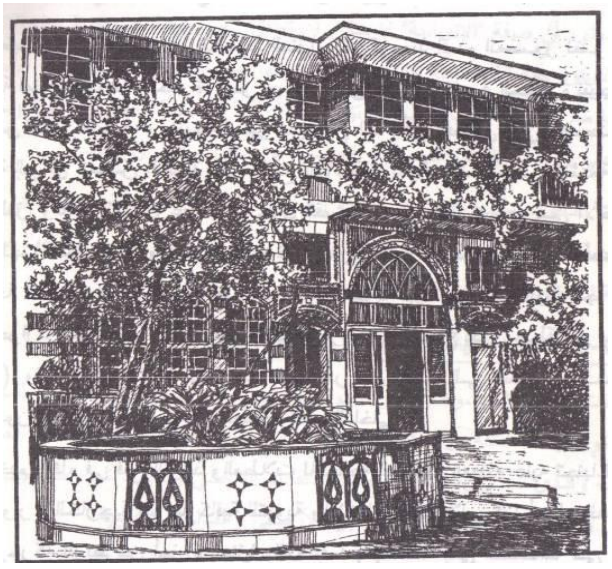


Figure 3. The Interior Court In A Traditional House In Damascus – Syria[8]

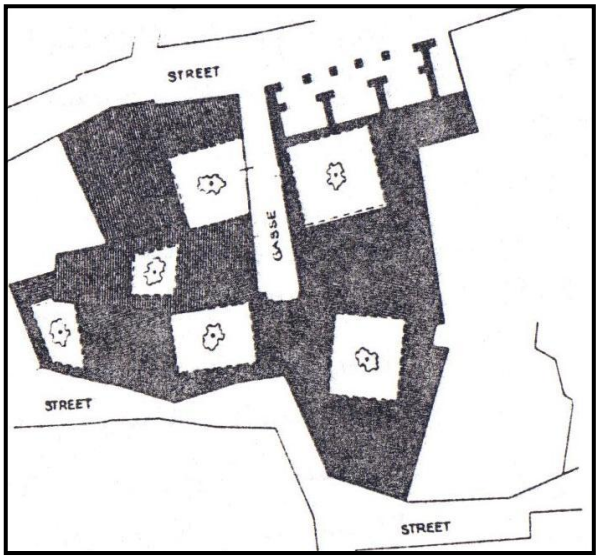


Figure 4. The Environmental Planning of The Houses In The Historical Zone In The Arab City Interior Court Planted For Every House And Narrow Streets[2]

***THE TRADITIONAL HOUSING ENVIRONMENT AND IT'S DISTINGUISHING:-**

It contains from the elements of urban planning as:

- Housing Groups: which it contains from special court houses neighboured with each other in the old city zone with small ways or locked ways(quarter).. and that planning organized with the combined planning. Fig(4).
- Fountains, trees and plants:-
  The inhabitants of these special houses take care with realizing the comfort climate in their houses by stablishing fountains in the middle of the living room for colding the air. And they plants trees and plants in the interior court for giving shadows and to make reduction in the hot degree of the air (As example house of Sehemy in Cairo).
- Streets Network:-
  In the old zones the street network consists of:-
  - Small streets (ways) the width between 3-b meters with closed end reached to houses.
  - Another streets has width more than 6m reached to the commercial shoppings.Zone which named (Kasaba).

***SECOND TOPIC:- THE ENVIRONMENTAL CONTEMPORARY URBAN HOUSING IN THE ARAB CITIES:**

There are a big development in the urban planning the last century and in the start of the 21th century the urban planning gives a large role with the help of the high technology and the new building materials. Which gives a big variety in designing different models of housing buildings and general buildings and buildings of services. Then the planning took different types in the urban planning in contrast with the traditional planning in the zones.

THE TYPES OF HOUSING ARE:-

- Special Housing: (villas,palaces): by planning in dividing pieces of lands for that purpose (high level of housing) with different areas,by two systems of planning (continous housing and separate housing. Fig(5-A, B)[3] and(6)[4].

Figure 5-A. Villa In New Cairo City (Egypt)[3]

Figure 5-B. A Palace In Obhar-Jeddah-KSA

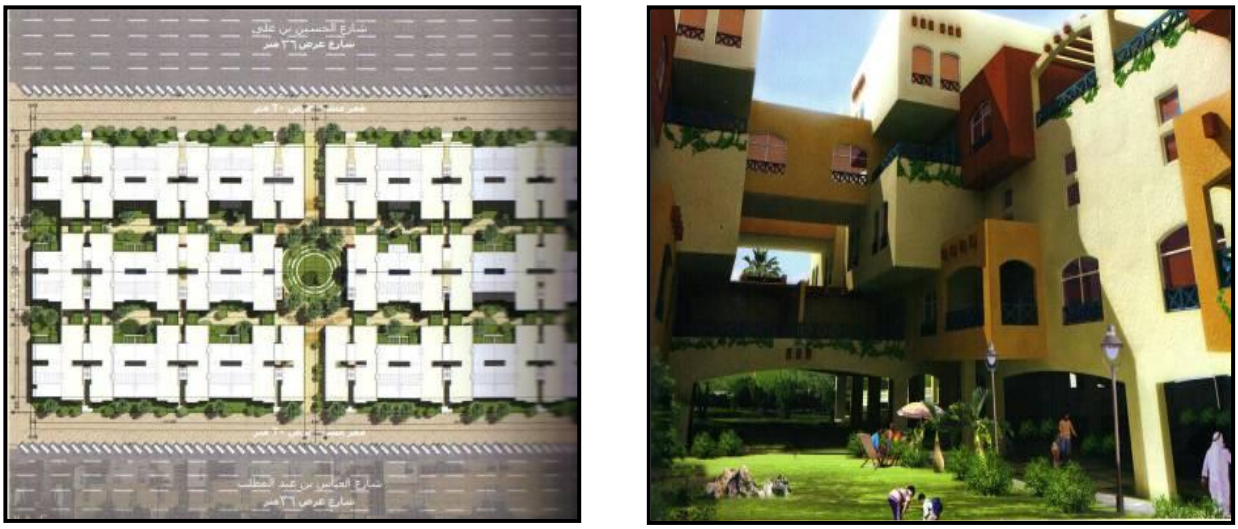


Figure 6. Group Of Villas- Al Izdehar Residential Complex In Riyadh[4]

- Free Building Houses:-
  That type of housing is build as block of buildings has some flats in one floor and consists of 3-5 floors,and different types of buildings in according to the level on income for inhabitants with green areas an sites for parking.Fig(7)&(8).[4]

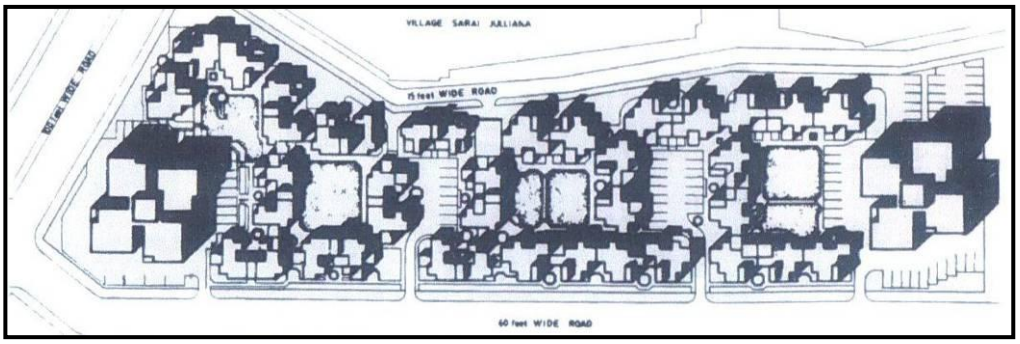
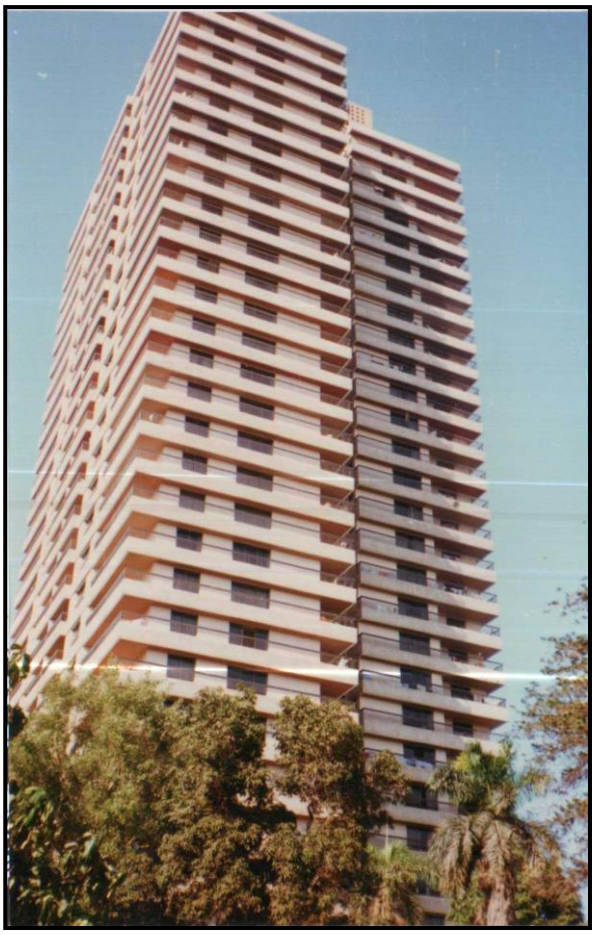


Figure 7. Free Housing Buildings Planning With Different Heights[4]

Figure 8. Another Example For Free Housing Buildings[4]

- Big Housing Buildings:-
  That type for a big number of flats in one floor and more than 5-10 floors, built as a solution for the housing problem in the Arab countries (as an example in Nasre city in the Big Cairo) often 1960.Fig(9).

Housing Complex in Nasr City - Cairo



Housing Tower in Zamalek - Cairo

Figure 9. Big Housing Complex and Housing Tower in Cairo
(one of the developing countries)

2-1 * THE NEW CONTEMPORARY HOUSING DESIGNS:

These types takes many models like:

- Repeated models.
- Specialty houses
- Court houses.
- Europeans model houses. With new shapes and facades and one splace living room, glass facades. Fig(6)

2-2 * THE ENVIRONMENTAL CONTEMPORARY URBAN HOUSING:

That is the urban society in the modern Arab City now(In the new extension of the big cities like the capitals of Arab countries like Riadh, Kuwait and Cairo as examples, and in the new settlements and New Towns housings.

All these groups of housing has the urban new elements like green areas, parking areas and services.

These different types are:

- The old and historical housing in the environment zone which has the traditional style of buildings(Heritage Buildings)
- The New Housing environment:
  That is the new extending zones in our Arab cities with new housing buildings free planning at the last 3 decades of the last century.
- The contemporary housing environment:
  That zones of housing is based upon the urban planning and the general plan of the city with new and modern types of housing,services and new high adminstration buildings with high technology.

THIRD TOPIC * THE EFFECTIVE ENVIRONMENTAL FACTORS UPON DESIGNING AND PLANNING THE CONTEMPORARY HOUSING GROUPS:

The process of designing and planning the environmental urban contemporary housing is to be exposed to many factors which contraled designing and making forms of housing buildings, and the style of it's planning and it's compositions.

Thus peoples have a large role in giving changing in building designs like their traditions and habits in life, too the environmental factors and the case of climate all these factors are considerd very important and very effective.

We did not forget the effectives of the progressive high technology and building materials in Architectural designs of new types if buildings.
Here I mentioned these factors as followed:

- The Natural Environment:-
  As contour levels of land, mountains, vallies, flat lands and water areas.
- Inhabitants and the level of income: It is a main factor for life because the Inhabitants with their culture, the level of their income and the social case, habits and tradition has an effective role in designing their house and the service buildings, which must be suitable to the level of urbanism and development.
- Types of houses: and level of housing has an effective role in the Architectural composition, volume, beauty and the environmental solutions in the housing neighbourhoods.
- Climate and housing: The climate has a big effeciency on the designs of the several types of housing, it's architecture facades and grouping zones, protecting from the hot climate in summer, shading and shadows, and the useful uses of trees, plants and green areas in the housing groups.
- Building materials and technology of buildings gives a big and wonderful varieties in architectural designs for all buildings and realized a treamendous height.
  Then it is has an effective role in the composition group of buildings and the green areas in between these urban sites.And the role of the new materials for protecting from the case of hot climate.
- The contemporary urban housing planning: It is one of the new systems for planning and the best one which effect in the planning of housing groups to realized the distenguishing solution or the wrong one.
- The systems of solutions and planning of the housing buildings and it's grouping according to the types of housing buildings and it's grouping according to the types of housing and the sites in the city. See Fig(10) &(11)[10]

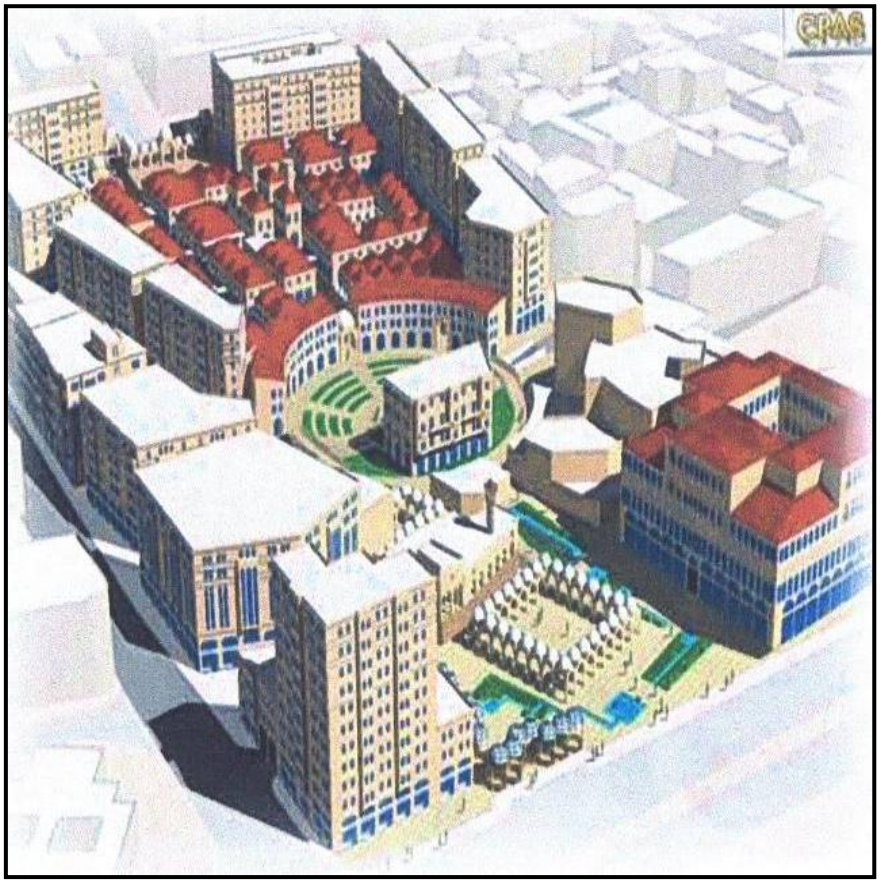


Figure 10. A model for the modern residential planning by using high technology[10]

Figure 11. A new touristic residential complex dense housing and high buildings with services and green areas[10]

FOURTH TOPIC: THE ENVIRONMENTAL AND ECONOMICAL PROCEEDS FOR THE CONSTITUATION OF REDUCING THE CONSUMPTION OF ELECTRICAL ENERGY IN THE CONTEMPORARY URBAN HOUSES

The enivronmental factors has a big impact upon the inhabitants life, and to realize the housing comfort (psychology and thermal).Then it is necessary to put some bases for protecting the housing buildings from the hot climate by the natural, environmental and technological means.

There are many considerations efforts must be realized in housing buildings to realize housing comfort as follows:

(1) The suitable Architecture designs for housing buildings.
(2) The correct direction for the housing buildings.
(3) Means of protecting housing buildings from the hot climate.
(4) The around environment and protecting from the hot climate.
(5) Environmental planning for housing groups and housing comfort.
(6) The environmental and economical proceeds.
(7) The constituations of reducing the consumption of electrical energy indoor the housing buildings.

We give a short study for these considerations for realizing housing comfort as follows:

4-1 THE SUITABLE ARCHITECTURE DESIGNS FOR HOUSING BUILDINGS:

The Architecture designs for housing buildings now became differents and more types in all world, and that is because the effects of social, economic, geographic and environment factors which has a big role in giving many changement in types and volumes. That in order to be suitable for the possibilities of peoples, the urban society and the country. See Fig(12)& (13) for some models of housing in the Arab countries and in the world.

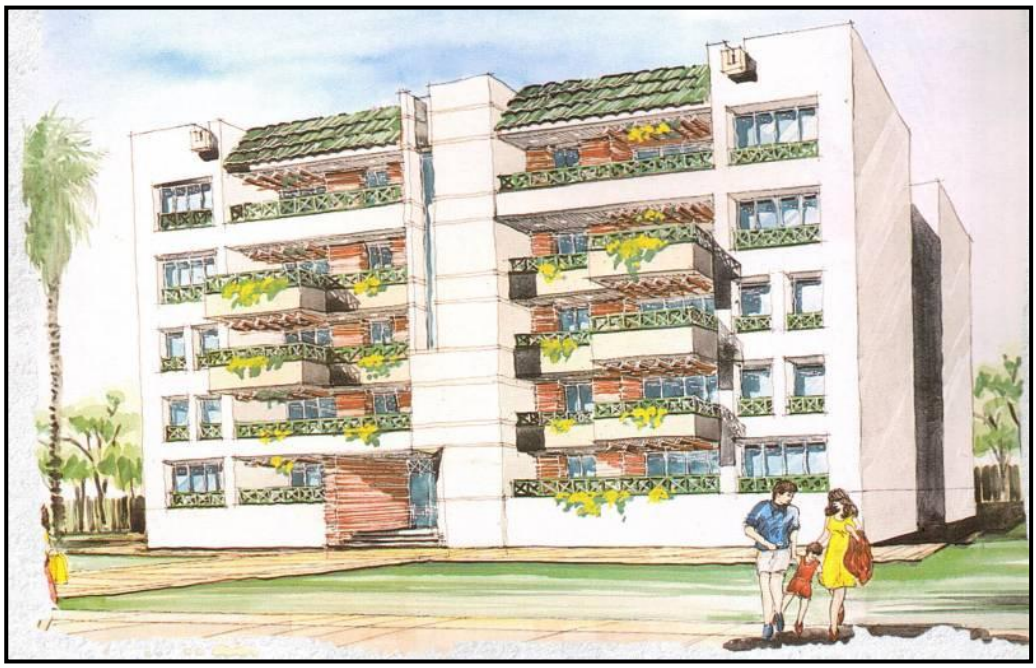


Figure 12. A contemporary model for green housing in Cairo - Egypt

Figure 13. A model of contemporary housing green building in Saudi Arabia[4]

4-2 THE CORRECT DIRECTION FOR THE HOUSING BUILDINGS:

It is one of the environments effectives which helped in realizing the natural lighting and ventilation for the housing units. Also the protecting from the hot sun-rays falls upon the house buildings or lighten from it's influences.

The best direction for housing buildings in the geographic hot zone to be directed with the consideration to wind directions to give cross ventilation in houses as Fig (14)

Also the south frontage has a small quantity of sun-rays because the angle of it is near vertical angle in summer and the adverse in winter.

4-3 MEANS OF PROTECTING HOUSING BUILDINGS FROM THE HOT CLIMATE:

There are many types of systems of protecting from the hot sun-rays in the buildings in the dry hot and humid climate.

Here we mentioned the important tools of protecting from the hot climate as follows:

- Shadows: must realized in the frontages in East,vest and in south to avoid the sun hot rays.
- Sun Breakers: must used for glass windows for protecting it and the houses from falling sun rays into the interior spaces of the house. Fig(15)[6]
- Suitable Building materials: for thermal insulation and the suitable materials which realized high thermal resistivity.
- Insulating Materials: for heat and the air spaces in between the building materials of walls and the double roof ceiling to realize the thermal comfort indoor houses.
- Light precast untis for the interior walls: for giving flexibility in making changements in the elements of houses in needful in any times.
- The Natural Lighting and Ventilation: by realizing system of windows, doors and openings for giving the good lighting and ventilating (cross ventilation) in the Architectural designs of the housing buildings.
- Green and planted roofs: for housing buildings which realized scaping about 90% of the hot sun rays and the reducted about 10 degrees of the roof [7] and in another study about 95% of sun rays[8]

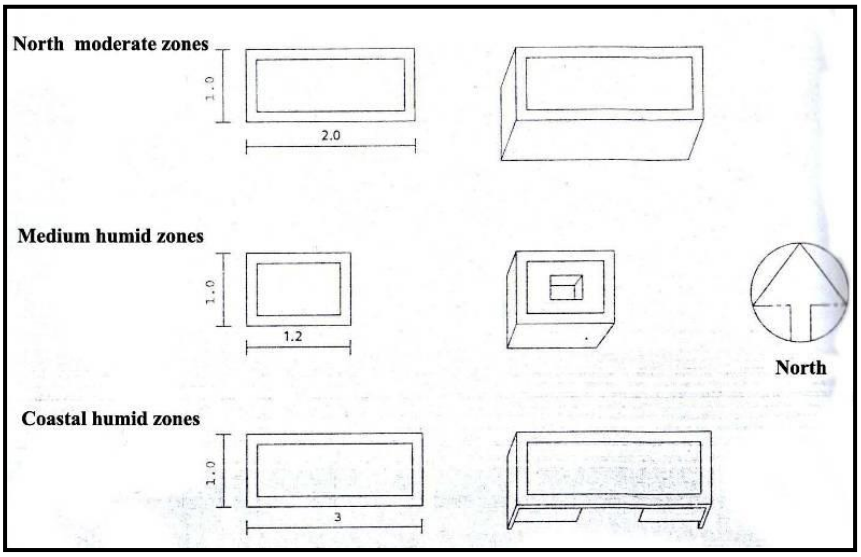


Figure 14. The suitable geographic orientation for the building in the main zones[5]

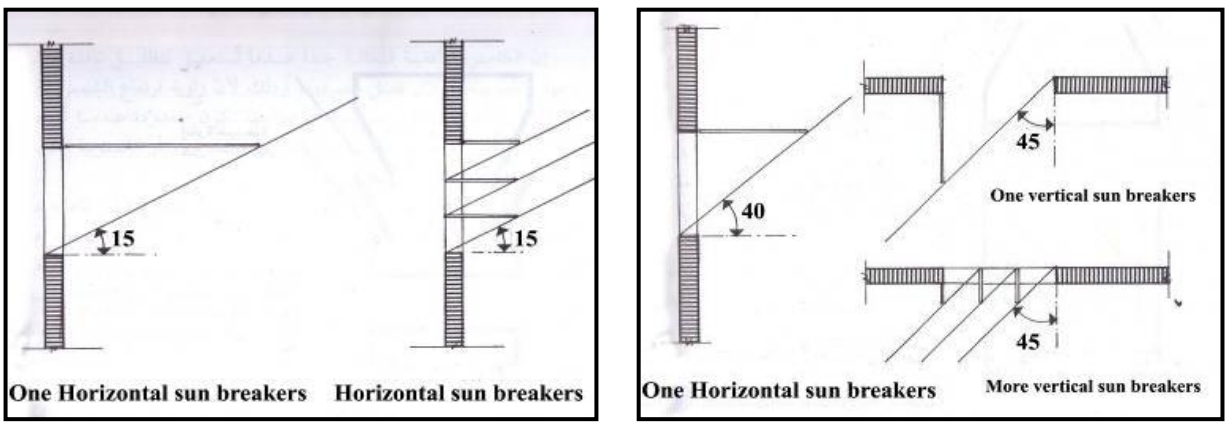


Figure 15. Horizontal and vertical sun breakers design[6]

4-4 THE AROUND ENVIRONMENT AND PROTECTING FROM THE HOT CLIMATE:

The around environment for the housing buildings from trees, plants and green areas should be very effectives to realize protecting from the hot climate and to realize the psychological and thermal comfort by applying these considerations:

- Green Areas and beauty: by arranging the green areas in between or out the housing groups, like flower plants shadow trees and green areas which gives natural and beautiful view, and the good psychology comfort to inhabitants.
- Green Areas and protecting from thermal rays of the sun specially by using trees, plants and green areas which absorbed thermal rays of the sun and to not be reflected to the housing buildings.
- Green Areas and pollution: trees absorbed carbon oxide two and giving Oxygen which very necessary for peoples' life. If we know that the green areas and trees absorbed about 8 kilogram from carbon oxide two in one hour, that equal the quantity which given by 200 person during breathing[8].And one hectar of green areas absorbed about 50-70 ton of dust in Air in one year and be reduced the percentage of condensation from about 30-40%[8].

4-5 ENVIRONMENTAL PLANNING FOR HOUSING GROUPS AND HOUSING COMFORT:

The process of the environmental planning is a contemporary problem because it reflected the case of the human society lives in these groping of housing, which characteristics with:

(1) The contemporary isolation life.
(2) The relationship between inhabitants and their urban housing groups.
(3) The environmental composition and arrangement of gardens and green areas.
(4) Progressive in urban construction and the social levels of inhabitants.
(5) Urban planning and services.
(6) The surrounding environment and it's integration with the urban settlement.

4-5-1 * THE CONTEMPORARY ISOLATION LIFE:

The modern urban planning were spread in all the world in the half of the last century, and took many different shapes and different designs of housings like free planning for housing, planning for divided lands for special housings. The blocks of building are isolated from each other, all these systems realized isolation life between inhabitants. Fig(16)&(17)[10]

In the last decades of the last century appeared the high and huge blocks of housing which means collected housings and these models appeared in our Arab countries specially in Egypt. In the extension of Cairo city, Nasr City were built with big blocking of Housing the height is more than ten floors and about 8-10 flat in the floor that means isolation between inhabitants horizontally and verticaly. Fig(16)

Figure 16. Large distance between housing buildings deal to isolation between inhabitants (housing complex in Saudia)[10]

Figure 17. Also large distance between housing buildings deal to isolation between inhabitants (housing complex in Dubai)[10]

4-5-2 * THE RELATIONSHIP BETWEEN INHABITANTS AND THEIR URBAN HOUSING GROUPS:

The beautiful composition of grouping the housing buildings and the beauty designs of it gives inhabitants the feeling of satisfaction.

Also the planning and the composition of buildings are different than each others because it's different sites, different types of housing, different densities (of inhabitants and dwellings) and types of services.

Every group of housing are distinguish with:

- The singularize of the housing groups.
- Feeling satisfaction from inhabitants to their housing groups, which means wishing to live in that urban settlement and it realized to them all services specially psychology, sociality.

4-5-3 * THE ENVIRONMENTAL COMPOSITION AND ARRANGEMENT OF GARDENS AND GREEN AREAS:

It is considered the using of the natural significants like land topography, water areas, different types of trees and plants.. Also the perfect urban planning and the beautiful arrangements to be space for amusement for the inhabitants.

This green housing areas must consist of:

- Green areas for ornamental trees with flowers and plants, green area for enjoyment by it's beautiful views.
- Green areas for sitting with fountains and flowers for enjoyment and taking rest.
- Green areas for children to play and enjoy spaces with their families. Fig(18)[10]

4-5-4 * PROGRESSIVE IN URBAN SETTLEMENTS AND THE SOCIAL LEVEL OF INHABITANTS:

It is one of the important factors for developing the urban environment, in it's planning and in designing the urban housing, and it reflected the level of income which realized progressing in our Arab cities.

That progressive in urban settlements is represented in some elements in the urban composition of the urban housing groups in these points:

- The social level of inhabitants: that type represented on types of housing like palaces, villas, blocks of medium income, blocks of economic income and blocks for low income peoples. All these social types gives different solutions in the urban planning.. But it must realized familiarity and social relationships in the urban housing groups for each.
- The main services buildings: for realizing justice in urban zones, it must be destributing the building services according to the urban planning. And that mean the progressings in the urban composition.

  The urban planning for the housing groups: In the aim to give good destribution for the housing buildings and according these considerations:
  - Containment: which realized the strong relationship between buildings and saving space area in between to be green area with flowers and trees.
  - Composition and distinction: that represented by planning and destributing building with horizontal level and vertical levels for giving fine composition for the housing groups.
  - Saving housing services: that mean saving simple services like seets and shadow trees in the green housing area and near fountains, for the inhabitants and sites for children. Also some places for simple commercial services and w.c with hall for some plays in the ground floor.

Figure 18. Housing complex in Saudi Arabia[10]

4-5-5 * URBAN PLANNING AND SERVICES:

The arrangement of urban settlement realized by applying the law of urban planning in the last decades in the 20th century.. and to preparing the general planning of the city in the course of the urban planning strategy in the country, which limited some elements:

- Distributing inhabitants and zones according to the strategy in the aim to realize comfort in their settlements, in the street network, general gardens and services sites.
- Saving commercial services.
- Saving healthy and education services.
- Saving administration and local services.
- Saving industrial zones for production and employments services.

4-5-6 * THE SURROUNDING ENVIRONMENT AND IT'S INTEGRATION WITH THE URBAN SETTLEMENT:

That means the urban planning for housing, first to be harmonious with the environment if it is desert lands or mountain contour lands or agricultural lands. Second the housing models to be suitable for each other as the architecture designs, the height of buildings and it's harmonious with these environments. Third taking care with realizing suitable spaces for type of housing and the economical and socials factors.

4-6 * THE ENVIRONMENTAL AND ECONOMICAL PROCEEDS:

The dealing with Environment became a necessary order and has it's importance, after we know that the man life gained by the friendship with it. Also the inhabitants settlements are engaged by activation with it (environment).The third point is to used the environmental constituents in treating the effectives aspects upon the inhabitants comforts and their lifes, and that considered very important in that time of the high technology and contemporary civilization in the 21th century.

We give an idea about the environmental constituents and it's economical proceeds in the housing groups as the following points:

4-6-1 *THE ENVIRONMENTAL PROCEEDS:

(1) The environmental green: trees, plants and green areas which has an important environmental proceeds by choosing the suitable types, and realize some points:

- The psychological feeling comfort from inhabitants for existence these trees, plants and green areas.
- The clearness reduction in the degree of temperature in summer.
- Feeling the beauty of the green environment in the space of the housing groups.
- Feeling safety and comfort for their children from the out traffic.
- The green environment sites for amusement and comfort for inhabitants gives feeling relationship with their housing sites.
- The green environment (trees, plants and green areas) help in giving purity from pollutions specially carbon oxide two, auto carbon and dusts.

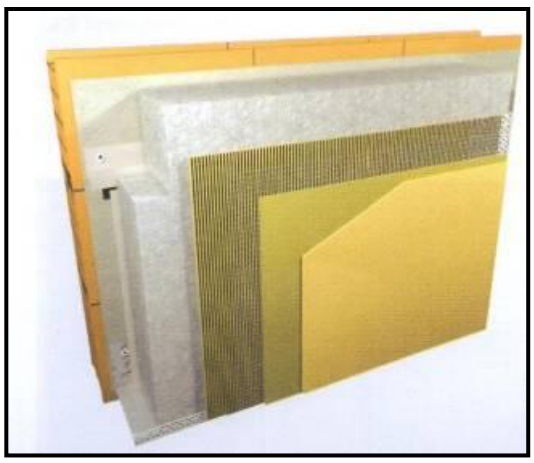
(2) Housing buildings and the environmental proceeds: It realized in housing buildings according to the standard which suitable with the environment and interact with it which seen under:

- Housing architecture designs realized the needs of inhabitants and has some levels (floors) realized the human scale.
- Housing architecture designs are friendship to environment.
- Relationship between inhabitants and environmental green beauty by putting plants and flowers in the floors and roofs of the housing buildings. Fig (19)[9]
- Treatments for the case of the hot climate by realizing the effectives designs by increasing the shade and shadow areas in the housing building facades. Fig(20)[3]
- Treatments for the roofs and walls of the housing buildings by using insolated materials or double roofs, planting these roofs or by using water in the aim to make reduction in the temperature degree of the hot sun rays in summer. Fig(21)[10]

Figure 21. Some insulation materials(sheets) for isola

Figure 19. Plants above the roofs of the building[9]

Figure 20. Housing complex (Rehab in Cairo Egypt)[3]



4-6-2 * ECONOMICAL PROCEEDS:

The environment and it's elements considered one of the main constituents for the remaining of housing buildings and it's sustainability..

Here we explain the economical proceeds for inhabitants as follows:

- Sustainability of housing buildings friendship with environment:
  It is the important factor when we preparing the architecture designs for housing buildings to has the environmental proceeds which realizing systems of comfort, specially the housing comfort and the thermal comfort.
- These are the factors of sustainability in realizing and using it, then it is considered an important and economical proceeds.
- Using the large green areas from the housing space and reducing the areas of pedestrian roads to the necessary needs. That gives us reducing the reflected hot rays of the sun to buildings, and the green areas gives Oxygen necessary for peoples life..all these elements represented an economical proceeds if we give the correct planning and used the suitable materials.
- Sun Energy and heating water: we could use the hot sun rays which give us the sun energy to heat water which used in houses. That is an economical proceeds Fig(22).[5]
- Sun Energy and producing electricity: there are many ways for producing electricity from sun rays. That is economical proceeds when we use that electricity in houses. Fig(23)[5]

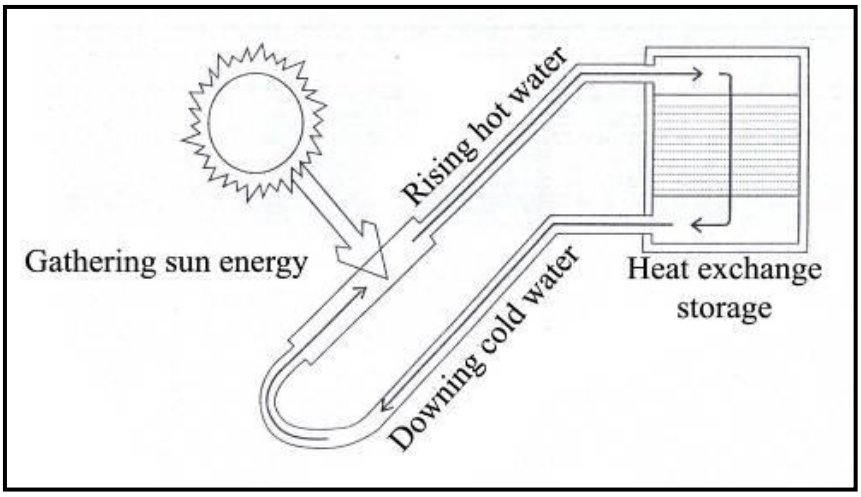


Figure 23. Generating electrical energy system from the sun energy

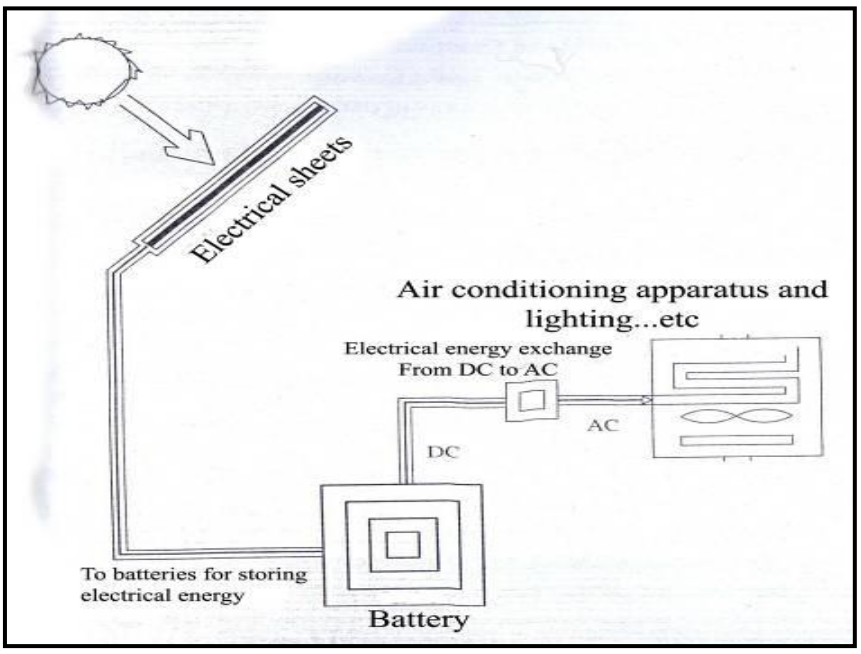


Figure 22. Using natural sun energy for heating water

4-7 * THE CONSTITUTIONS OF REDUCING THE CONSUMPTION OF ELECTRICAL ENERGY INDOOR HOUSING BUILDINGS:

It is considered one of the important factors of environmental designs for the housing buildings. That subject is very important in the national level for the economical direction.

Taking in consideration the role of the green buildings and the surrounding green areas in saving a big amount of using electricity indoor their houses.

That is because of it's civilization proceeds for the architectural and environmental form of the urban housing groups and for developing all the city in general.

The constitutions of reducing the consumption of electrical energy in the housing green buildings are:

4-7-1 * USING THE SUITABLE BUILDING MATERIALS:

As bricks and blocks of limestone in constructing outer walls in the housing buildings according to it's specifications which gives us (Time lag) to transfer the thermal convections to the inner spaces of the house after many hours in the day as follows in table (1):

Table (1) Time lag for some building materials:[11]

Time building material	Time lag (hour)
Brick walls	10.40
Brick front walls	6.10
Limestone	8.90
Marble	6.60
Concrete	7.50
Gypsum	12.40

Using bricks or limestone blocks in constructing outer walls prevent heats by it's time lag during the day in houses, this give some thermal comfort which help in reducing the uses of air conditioning with the good natural ventilations.

4-7-2 * USING THE INDUSTRIAL INSULATIONS MATERIALS:

By using these materials in between the outer walls, also in the roof ceilings..This insulations materials like:

- Polystyrene, polyurethane, glass wool and mineral wool, some materials like sheets and others like grains, and others like roles.
- All these insulating materials prevent heat partial about the inner spaces of houses..and reducing the uses of air conditioning.

4-7-3 * USING SUN BREAKERS:

The purpose of using it, is to give shadows on the glass of the windows during the day in summer to prevent the hot sun rays to inter the spaces of houses.

The uses of glass in windows for lighting but it is necessary to prevent the hot sun rays, and it is necessary too to use solar control glass (like absorptive glass and reflective glass).These types allowed only 30 - 43% from sun rays to penetrate indoor houses.[6]

To prevent hot sun rays and to reduce penetrate it, this using realized the feeling of thermal comfort and reducing the consumption of using electricity.

4-7-4 * FLEXIBILITY IN CHANGING THE HOUSING ELEMENTS AND REALIZING NATURAL VENTILATION:

This is the active element which realize the possibility of changing spaces, areas and elements interior the house according to the family needs. We could used light partitions isolated voices, has the possibility of changing it's locations, and has doors and openings which arranged with windows to allow giving the cross natural ventilation which has oxygen and to drive away the dislike smell, and carbon oxide two out of houses.

This is an active element for realizing the thermal comfort indoor houses which help in realizing comfort indoor houses which help in reducing the consumption of electrical energy.

4-7-5 * PROTECTING THE HOUSING ROOFS FROM THE HOT CLIMATE: For using many natural systems for ventilation or by cooling roofs by using water or using green areas upon roofs in the aim of protecting it from the hot sun rays in summer added to that using the effective insulation materials.

All that help in realizing thermal comfort indoor houses which help in reducing the consumption of electrical energy.

4-7-6 * GREEN PLANTS IN THE GREEN BUILDING FLOORS: For giving shadow in the housing facades and giving the beauty for the buildings, the thermal comfort and the psychological comfort in their houses.

4-7-7 * THE ENVIRONMENTAL PROCEEDS FOR GARDENS: Around green housing buildings by using plants, flower, trees and shadow trees for ornaments and protecting from the hot climate.

4-7-8 * USING SUN ENERGY: In heating water necessary for inhabitants and for producing electricity for housing lights and different uses. Fig(22)[5]

***RESULTS AND RECOMMENDATIONS:**

FIRST * RESULTS:

From the research study we reached to many results as follows:-

(1) The old and historical zones in the Arab City is considered an important part in Arab civilization,because it gathered our heritage buildings which distinguished with Architecture (environmental architecture) by using the interior court, wind catcher,using mud bricks and limestone in building the houses and oricls for protecting the houses from the hot climate in summer and giving speciality for their inhabitants.

(2) The distinguish planning and designing for the old housing environment in the Arab city:
- The combined planning distinguished with it's old court houses neighbored with each others and narrow streets for giving shadows and protecting from the hot sun rays.
- The heritage houses distinguished with the inner court which planted with trees and plants for the speciality and giving shadows and beautiful views.
- Using fountains for cooling the air in the living spaces in the house.
- Using the wind catchers and water for cooling hot air and moving it in different rooms in houses.

(3) The distinguish in the contemporary urban housing environment in the Arab city:
- The big typing of houses architectural designs, and it's different heights, different levels housings and many different building materials with contemporary high technology.
- The contemporary urban environment in the Arab City contains from 3 types of housing environments:
  - The old, historical and heritage housing environment.
  - The new environmental houses in the 20^{th} century.
  - The contemporary environmental houses which distinguished with high technology and architectural and different art designs.

(4) Housing environment effected with many important factors:

The natural environment, environment and climate, climate and housing, types of housing and the level of income, building materials and the technology of construction, and the contemporary urban planning for housing.

(5) The environmental and economical proceeds realized by:
- The suitable architectural designs for the house buildings.
- The correct direction for the house buildings.
- Using systems of protecting houses from hot climate.
- The interesting for the environmental proceeds for the surrounding environment for protecting from the hot climate.
- Realizing the environmental planning for the contemporary housing groups (zones).

(6) The constitutions of reducing the consumption of the electrical energy in the housing buildings: it realized by:
- Using the suitable building materials and to be according to specifications and isolated heat.
- Using the industrial insulation building materials for heat with it's different types in constructing the building houses.
- Using sun breakers for protecting glass windows and to use the absorptive and reflective glass.
- Realizing the natural ventilation in houses by using system of flexibility for the future needs to which realize sustainability.
- Protecting the roof of housing buildings by using the ventilation between two roofs slabs, cooling roofs by planted it and by cooling it by water.
- Using plants in the housing building floors in facades, shadows and cooling air, ornaments in building and protecting from the hot climate.
- The environmental proceeds by plants, trees and green areas to give shadows and prevent reflecting the hot sun rays to the housing buildings.
- Using sun energy in heating water and producing electricity for housing uses.

(7) The environmental and economical proceeds and the factors give protecting from the hot climate and saving the thermal comfort for inhabitants in their urban housing groups(zones) in summer in the Arab countries, considered the important constitutions for realizing thermal comfort in houses and for realizing thermal comfort in houses and realizing the big economic reduction in the electrical energy.

SECOND * RECOMMENDATIONS:

(1) Laws and legislations must be confirms and putting the rules in designing the contemporary green housing buildings with the consideration of environmental factor.. in the aim to develop the urban settlements in the Arab City.

(2) To form pords specialized in supervising and making control in designing and executing the projects of housing and applying the environmental system.

(3) To apply the constitutions of reducing the consumptions of electricity in houses, and to rationalizing in using electricity energy in the Arab cities after the wide extension in the urban settlements.

(4) It is necessary to benefit from the sun energy in heating water and producing electricity for the housing uses with the consideration of applying the economical and industrial technology ways.

(5) Laws and legislations must confirms to arrange the using of the sun energy in the housing and general buildings.

(6) To form pords specialized in calculating the economical proceeds in saving electrical energy in the green housing buildings.

(7) Also to calculate the electrical energy producted from the sun energy and making control for operating and preservation for generalizing uses.

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